



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/505,264	02/01/2005	Yutaka Minami	257262US0PCT	3925
22850 7590 04/23/2007 OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER LEE, RIP A	
			ART UNIT	PAPER NUMBER
			1713	
SHORTENED STATUTORY PERIOD OF RESPONSE		NOTIFICATION DATE	DELIVERY MODE	
3 MONTHS		04/23/2007	ELECTRONIC	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 04/23/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary

Application No.

10/505,264

Applicant(s)

MINAMI ET AL.

Examiner

Rip A. Lee

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 9 and 11-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-7, 9, 10 and 13 is/are allowed.
- 6) ☒ Claim(s) 11 and 12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action follows a response filed on January 26, 2007. Claims 1-5, 11, and 12 were amended. Claim 10 was canceled, and new claim 13 was added. Claims 1-7, 9, and 11-13 are pending.

Claim Objections

1. Claims 1, 2, and 5 are objected to because of the following informalities: The claim language is confusing because there are two antecedents of the term “the two ligands” (the word “ligand” has been used previously in the claims to denote the carbocyclic ligand set and the ancillary ligands X¹). Since the structure of transition metal complex (II) clearly shows A¹ and A² bridging the cyclopentadienyl moiety of the carbocyclic ligand, the description that “A¹ and A² is capable of bonding the two ligands to each other” is unnecessary and may be deleted. Appropriate correction is required.

2. Claims 1, 2, and 5 are objected to because of the following informalities: Please replace “X¹ is a ligand capable of forming a σ -bond” with “X¹ is a ligand that forms a σ -bond”. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1713

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsutsui *et al.* (JP 62-119213; cited in Applicant's IDS of 08-20-2004) in view of Collina *et al.* (U.S. 6,180,720).

Tsutsui *et al.* teaches a random copolymer of (60-98 mole %) of 1-butene and (2-40 mole %) of α -olefin and having an intrinsic viscosity of 0.5-6 dL/g and a melting point in the range of 40-30 °C (see abstract). The polymer microstructure is not disclosed, however, in light of the fact that butene based polymers are also prepared with metallocene catalysts, a reasonable basis exists to believe that the polymers of the invention exhibit the claimed stereoregularity index. Since the PTO can not perform experiments, the burden is shifted to the Applicants to establish an unobviousness difference. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). The reference does not disclose use of butene based polymer as resin modifier, as recited in the instant claim.

Use of such polymers as modifier (plasticizer) for thermoplastic resin is well established in the art. Collina *et al.* discloses use of butene polymers as resin modifier in order to improve the flexibility and softness of thermoplastic polyolefin compositions (see discussion, column 1). It would have been obvious to one having ordinary skill in the art to use the butene based polymer of Tsutsui *et al.*, as a resin modifier, as disclosed by Collina *et al.* because this is a well known utility for this class of polymer.

Instant claim 11 is presented in product-by-process format. It is well settled that where product by process claims are rejected over a prior art product that appears to be the same, the burden is shifted to the Applicant to establish an unobviousness difference, even if the production processes are different.¹ Furthermore, the patentability of a product claim rests on the product formed, not on the method by which it was produced.²

Art Unit: 1713

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsutsui *et al.* in view of Fralich *et al.* (U.S. 6,218,457).

Tsutsui *et al.* teaches a random copolymer of (60-98 mole %) of 1-butene and (2-40 mole %) of α -olefin and having an intrinsic viscosity of 0.5-6 dL/g and a melting point in the range of 40-30 °C (see abstract). The polymer microstructure is not disclosed, however, in light of the fact that butene based polymers are also prepared with metallocene catalysts, a reasonable basis exists to believe that the polymers of the invention exhibit the claimed stereoregularity index. Since the PTO can not perform experiments, the burden is shifted to the Applicants to establish an unobviousness difference. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). The reference does not disclose use of butene based polymer as hot melt adhesive, as recited in the instant claim.

Use of such polymers as hot melt adhesive is well established in the art. Fralich *et al.* teaches that hot melt adhesives made from polybutene polymer exhibit greater high peel stress and high shear stress than conventional hot melt adhesives. It would have been obvious to one having ordinary skill in the art to use the butene based polymer of Tsutsui *et al.* as a hot melt adhesive, as taught by Fralich *et al.*, because this is a well known utility for this type of polymer.

Instant claim 12 is presented in product-by-process format. It is well settled that where product by process claims are rejected over a prior art product that appears to be the same, the burden is shifted to the Applicant to establish an unobviousness difference, even if the production processes are different.¹ Furthermore, the patentability of a product claim rests on the product formed, not on the method by which it was produced.²

¹ *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983).

² *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Allowable Subject Matter

7. The following is a statement of reasons for the indication of allowable subject matter: Claims 1-7, 9, 10 and 13 are allowed over the closest references cited below.

The present invention is drawn to a process for producing a high-fluidity 1-butene based polymer comprising homopolymerizing 1-butene, or copolymerizing 1-butene with ethylene and/or a C₃ or C₂₀ α -olefin except for 1-butene, in the presence of a polymerization catalyst comprising (A) a transition metal compound represented by general formula (II) and (B) at least one component selected from the group consisting of (B-1) a compound capable of forming an ionic complex by reacting with said transition metal compound (A), and (B-2) aluminoxane.

Another aspect of the invention is drawn to a process for producing a high-fluidity 1-butene based polymer satisfying the requirements: (1) intrinsic viscosity $[\eta]$ of 0.01 to 0.5 dL/g (tetralin, 135 °C), (2) melting point (T_m -D) of 0 to 100 °C, and (3) stereoregularity index $(mmmm)/(mmrr + rmmr)$ of 30 or lower, comprising homopolymerizing 1-butene, or copolymerizing 1-butene with ethylene and/or a C₃ or C₂₀ α -olefin except for 1-butene, in the presence of a polymerization catalyst comprising (A) a transition metal compound represented by general formula (II) and (B) at least one component selected from the group consisting of (B-1) a compound capable of forming an ionic complex by reacting with said transition metal compound (A), and (B-2) aluminoxane.

A third aspect of the invention is drawn to a process for producing a high-fluidity 1-butene based polymer satisfying the requirements: (1) intrinsic viscosity $[\eta]$ of 0.01 to 0.5 dL/g (tetralin, 135 °C), (2) melting point (T_m -D) of 0 to 100 °C, and (3) mesopentad fraction $mmmm$ of 68 to 73 %, comprising homopolymerizing 1-butene, or copolymerizing 1-butene with ethylene and/or a C₃ or C₂₀ α -olefin except for 1-butene, in the presence of a polymerization catalyst comprising (A) a transition metal compound represented by general formula (II) and (B) at least one component selected from the group consisting of (B-1) a compound capable of forming an ionic complex by reacting with said transition metal compound (A), and (B-2) aluminoxane.

The salient feature of transition metal complex (II) include: the carbocyclic ligand set is one in which substituents R^6 and R^7 and substituents R^8 and R^9 are bonded to each other to form a ring, cyclopentadienyl moieties of the carbocyclic ligand set are bridged in a (1,2')(2,1') fashion by bridging groups A^1 and A^2 , and bridging groups A^1 and A^2 are the same or different and are independently a C_1 - C_{20} halogen containing hydrocarbon group, or a silicon containing group, *inter alia*.

See claims for full details.

According to the present specification, the term "1-butene based" refers to polybutene homopolymer, as indicated in the process claims, or a (random) butene copolymer in which the content of structural units derived from 1-butene in the copolymer is 50 mole % or higher, and more preferably, 70 mole % or higher. Inventors further teach that where the content of structural units derived from 1-butene in the copolymer is less than 50 mole %, the resultant copolymer tends to be deteriorated; see specification, page 13.

Minami *et al.* (WO 99/67303; equivalent document U.S. 6,906,155) teaches a process for making propylenic polymer in the presence of a catalyst comprising a doubly bridged, *bisindenyl* ligand set having (1,2')(2,1') silylene/silylene connectivity. The patent teaches use of catalyst for preparing propylenic polymer which is a propylene homopolymer or a copolymer of propylene with ethylene and/or C_{4-20} α -olefin. The amount of co-monomer is less than about 10 wt %. In one example, propylene polymer containing 0.9 wt % of butene comonomer is prepared in the presence of a catalyst comprising (1,2'- Me_2Si)(2,1'- Me_2Si) Ind_2ZrCl_2 . This polymer has an intrinsic viscosity of 1.2 dL/g. In another example, essentially the same catalyst is used to prepare a propylene polymer containing 9 wt % of butene comonomer that exhibits an intrinsic viscosity of 2.2 dL/g. It appears that propylene polymers containing increasing amounts of 1-butene comonomer exhibit higher values of intrinsic viscosity. Clearly, the prior art of Minami *et al.* does not teach or make obvious the subject matter of the instant claims.

Minami *et al.* (U.S. 6,414,090) teaches a process of making polymers of α -olefins having four or more carbon atoms in the presence of a catalyst containing transition metal complex having a doubly bridged, *bisindenyl* ligand set. The reference discloses use of (1,1')(2,2') alkylene/silylene, (1,1')(2,2') alkylene/alkylene, and (1,1')(2,2') silylene/silylene bridging combinations, but there is no teaching of use of (1,2')(2,1') bridging geometry.

Minami *et al.* (WO 99/09098 ; equivalent document U.S. 6,562,886) discloses a propylene copolymer containing not less than 80 mole % of units derived from propylene and 0-20 mole % of units derived from ethylene and/or C₄₋₂₀ α -olefin and having an intrinsic viscosity in the range of 0.5-5.0 dL/g. Another aspect of the invention is a polymer containing at most 0.5 mole % of ethylene and/or C₄₋₂₀ α -olefin and having an intrinsic viscosity in the range of 0.01-1.0 dL/g. These polymers are not prepared according to the process described in the instant claims.

Yabunouchi *et al.* (WO 0509172; equivalent document U.S. 5,854,165) discloses a process for preparing polymer in the presence of a catalyst comprising a doubly bridged transition metal complex component containing a (1,1')(2,2') alkylene/silylene, a (1,2')(2,1') alkylene/silylene, or a (1,2')(2,1') alkylene/alkylene bridging geometry. There is no teaching of use of catalyst comprising a transition metal complex containing a (1,2')(2,1') silylene/silylene bridging groups as required by the instant claims.

Kahsiwamura *et al.* (WO 96/30380 ; equivalent document U.S. 6,339,135) discloses preparation of olefin polymer in the presence of a catalyst comprising a doubly bridged transition metal complex component containing a (1,1')(2,2') or (1,2')(2,1') alkylene/alkylene bridging groups. There is no teaching of use of catalyst comprising a transition metal complex containing a (1,2')(2,1') silylene/silylene bridging groups as required by the instant claims.

Response to Arguments

8. Applicant's arguments with respect to the rejection of claims over Minami *et al.* (U.S. 6,414,090), Evertz *et al.* (U.S. 5,496,902), Kashiwamura *et al.* (U.S. 6,339,135) and Yabunouchi *et al.* (U.S. 5,854,165) are persuasive, and the rejections have been withdrawn.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

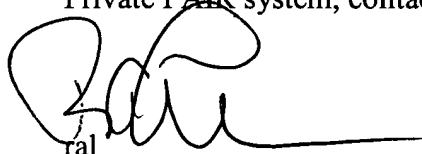
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

DAVID W. WU
SENIOR PATENT EXAMINER
BIOLOGY CENTER 1700

Art Unit: 1713

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rip A. Lee whose telephone number is (571)272-1104. The examiner can be reached on Monday through Friday from 9:00 AM - 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached at (571)272-1114. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on the access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).



ral

April 13, 2007



DAVID W. WU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700